WE CLAIM:

1. A heat exchanger comprising:

a first wall that extends along a first direction and defines a first perimeter in a plane that is perpendicular to said first direction;

a second wall that defines a second perimeter and is positioned within said first perimeter, wherein said first wall and said second wall are spaced from one another so as to define a volume of space therebetween;

a lid attached to a top portion of said first wall and a top portion of said second wall;

a bottom attached to a bottom portion of said first wall and a bottom portion of said second wall;

a spiral tubing positioned within said volume of space, wherein at least a portion of said spiral tubing does not contact either said first wall or said second wall so that a first gap is formed between said first wall and a first portion of said spiral tubing positioned nearest said first wall and a second gap is formed between said second wall and a second portion of said spiral tubing that is positioned nearest said second wall; and

a first fluid that flows within said spiral tubing and a second fluid that flows within said first and second gaps.

2. The heat exchanger of claim 1, wherein said spiral tubing in its entirety fails to contact either said first wall or said second wall.

3. The heat exchanger of claim 1, wherein a second portion of said spiral tubing contacts both said first wall and said second wall.

4. The heat exchanger of claim 1, wherein said first gap has a magnitude that ranges from 0.2 mm to 0.5 mm.

5. The heat exchanger of claim 1, wherein said second gap has a magnitude that ranges from 0.2 mm to 0.5 mm.

6. The heat exchanger of claim 4, wherein said second gap has a magnitude that ranges from 0.2 mm to 0.5 mm.

7. The heat exchanger of claim 1, wherein a magnitude of said first gap is the same as a magnitude of said second gap.

8. The heat exchanger of claim 7, wherein said magnitude of said first gap is approximately 0.3 mm.

9. The heat exchanger of claim 1, wherein said magnitudes of said first and second gaps are chosen so as to reduce pressure drop without adversely affecting heat exchange performance.

10. The heat exchanger of claim 1, wherein magnitudes of said first and second gaps are chosen so as to maximize heat exchanging.

11. The heat exchanger of claim 1, wherein widths of said first and second gaps are varied as a function of distance between adjacent spiral tubing.

12. The heat exchanger of claim 11, wherein said widths of said first and second gaps are varied so as to achieve an optimal combination of high heat transfer and low pressure drop.

13. The heat exchanger of claim 1, wherein said spiral tubing is made of a highly thermally conductive material.

14. The heat exchanger of claim 1, wherein said first wall is cylindrical in shape and said second wall is cylindrical in shape.

15. The heat exchanger of claim 14, wherein said first wall and said second wall are co-axial with respect to one another.

16. The heat exchanger of claim 1, wherein said first fluid is at a high temperature and high pressure.

17. The heat exchanger of claim 1, wherein said second fluid is at a low temperature and a low pressure.

18. The heat exchanger of claim 16, wherein said second fluid is at a low temperature and a low pressure.

19. The heat exchanger of claim 1, wherein said first and second fluids generally flow in opposite directions with respect to one another.

20. The heat exchanger of claim 18, wherein said first and second fluids generally flow in opposite directions with respect to one another.

21. The heat exchanger of claim 18, wherein said first fluid is selected from the group consisting of CO_2 and R134a.

22. The heat exchanger of claim 18, wherein said second fluid is selected from the group consisting of CO_2 and R134a.

23. The heat exchanger of claim 21, wherein said second fluid is selected from the group consisting of CO_2 and R134a.

24. The heat exchanger of claim 1, wherein said tubing is connected to a gas cooler.

25. The heat exchanger of claim 1, wherein said tubing is connected to a condenser.

26. The heat exchanger of claim 1, further comprising a J-tube having one end in fluid communication with said volume of space.

27. The heat exchanger of claim 1, wherein a first component of said second fluid flows along an exterior of said tubing and a second component of said second fluid flows within said first and said second gaps.

28. A method of exchanging heat, comprising:

flowing a high pressure, high temperature fluid within a tubing generally along a first direction; and

flowing a low pressure, low temperature fluid within a first gap formed between a first wall and a first portion of said tubing positioned nearest said first wall and a second gap formed between a second wall and a second portion of said tubing that is positioned nearest said second wall.

29. The method of claim 28, wherein said high-pressure, high temperature fluid flows in a helical path within said tube.

30. The method of claim 28, further comprising accumulating said low pressure, low temperature fluid at a bottom of a volume of space defined at least in part by said first wall and said second wall.

31. The method of claim 30, further comprising expelling a vapor portion of said low pressure, low temperature fluid present within said volume of space.

32. The method of claim 28, further comprising flowing a portion of said low pressure, low temperature fluid along an exterior of said tubing.